REMARKS/ARGUMENTS

Claims 1-11 are pending in this application.

Applicant greatly appreciates the Examiner's indication that claims 1-4 and 8-10 are allowed.

Claims 5 and 7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Xie et al. (U.S. 5,644,634) in view of Timm (U.S. 4,231,103). Claims 6 and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Xie et al. in view of Timm, and further in view of Felder et al. (U.S. 6,370,244). Applicant respectfully traverses these rejections.

Applicant's claim 5 recites:

> "A multi-frequency tone detector comprising an analysis filter for detecting the tone energies of an input signal at a plurality of tone frequencies of interest and a decision logic block for detecting presence or absence of said tone frequencies of interest based on said detected tone energies, characterized in that **said analysis filter has a window size chosen such that adjacent ones of said tone frequencies of interest are located at spectral nulls of said filter**." (emphasis added)

The Examiner alleged that Xie et al. teaches all of the features recited in Applicant's claim 5, except for "aligning the spectral nulls of the filter response with any tones with frequencies adjacent to the tone being detected." The Examiner further alleged that Timm "teaches that in spectral analysis with adaptive windows, the filter response has a null at frequencies Fm (Col 1 line 46 to Col 2 line 45). Timm further teaches that leakage may occur (inaccurate detection) if the input signal contains signals with frequency components other than Fm." Thus, the Examiner concluded that it would have been obvious "that Xie [et al.] could align the spectral nulls of the filter response to fall on any signals adjacent to the signals being detected for the advantage of further reducing any spectral leakage and increasing detection accuracy." Applicant respectfully disagrees.

Contrary to the Examiner's allegations, Timm does **not** teach or suggest the

feature of "said analysis filter has a window size chosen such that adjacent ones of said tone frequencies of interest are located at spectral nulls of said filter" as recited in Applicant's claim 5. In Timm, the length of the filter **is fixed** at N=1024 (see col. 5, line 29). Therefore, the frequencies Fm of Timm are fixed and equally spaced. There is no teaching or suggestion in Timm that the filter length could or should be chosen or adjusted to position the spectral null at the interfering frequency.

Rather than choosing the window size of the analysis filter such that adjacent ones of the tone frequencies of interest are located at spectral nulls as in Applicant's claimed invention, Timm is directed to the problem of minimizing the contribution of side lobes using a frequency domain approach. Specifically, Timm uses X(fm) and the adjacent bins X(fm-1) and X(fm+1) to approximate a time domain windowing function. As the Examiner is presumably aware, multiplication in the time domain is equivalent to convolution in the frequency domain.

Thus, the configuration of Fig. 4 of Timm is an approximation of the frequency convolution of a time domain window where the weights of the adjacent frequency response components are adjusted. This is equivalent to using an adaptive windowing function in the time domain. However, as opposed to choosing or adjusting the window "**size**," as in Applicant's claimed invention, the window **shape** is adjusted. For example, if Wm-1 and Wm+1 are 0, the window is a rectangular window. If Wm-1 and Wm+1 are any value other than 0, a window shape other than a rectangular window can be approximated (e.g., Hamming window, Hanning window, etc.). As discussed above, the actual placement of the nulls is completely irrelevant and is not considered or contemplated in Timm.

As previously discussed in the Request for Reconsideration filed on September 21, 2004, Xie et al. optimizes DFT by adjusting Fm, so that the middle of the analysis window corresponds to the signal to be detected. In order to accomplish this, Xie et al. chooses a window size such that the period of Fm is an integer multiple of the window size. Similar to Timm, the placement of the nulls is irrelevant and is neither discussed

nor contemplated in Xie et al.

Thus, contrary to the Examiner's allegations, neither Timm nor Xie et al. teaches or suggests the feature of "said analysis filter has a window size chosen such that adjacent ones of said tone frequencies of interest are located at spectral nulls of said filter" as recited in Applicant's claim 5.

Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection of claim 5 under 35 U.S.C. § 103(a) as being unpatentable over Xie et al. in view of Timm.

Felder et al. was relied upon to allegedly teach a rectangular window size. However, Felder et al. clearly fails to teach or suggest "said analysis filter has a window size chosen such that adjacent ones of said tone frequencies of interest are located at spectral nulls of said filter" as recited in Applicant's claim 5. Thus, Applicant respectfully submits that Felder et al. fails to cure the deficiencies of Xie et al. and Timm described above.

Accordingly, Applicant respectfully submits that Xie et al., Timm and Felder et al., applied alone or in combination, fail to teach or suggest the unique combination and arrangement of method steps and features recited in claim 5 of the present application.

In view of the foregoing amendments and remarks, Applicant respectfully submits that Claim 5 is allowable. Claims 6, 7 and 11 depend upon claim 5, and are therefore allowable for at least the reasons that claim 5 is allowable. Claims 1-4 and 8-10 are allowable as indicated by the Examiner.

In view of the foregoing amendments and remarks, Applicant respectfully submits that this application is in condition for allowance. Favorable consideration and prompt allowance are solicited.

The Commissioner is authorized to charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1353.

Respectfully submitted,

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